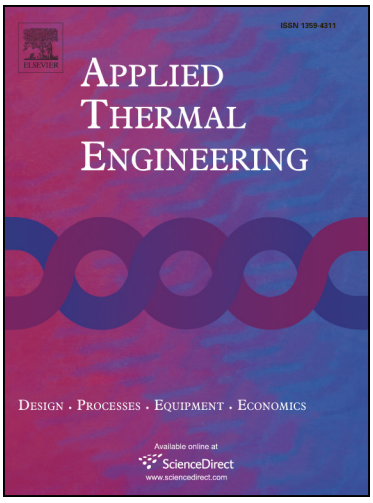

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Arslan Saleem, Man-Hoe Kim

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Air-side thermal hydraulic performance of microchannel heat exchangers with different fin configurations

Arslan Saleem, Man-Hoe Kim*

School of Mechanical Engineering, Kyungpook National University, Daegu 41566, Korea

ABSTRACT:

This paper presents three-dimensional steady state analysis of compact multi-louvered fin and flat tube heat exchangers applicable in domestic and mobile air conditioning systems. Conjugate heat transfer analysis has been conducted for five geometric configurations of the heat exchanger based on the louver pitch values (0.8, 1.0, 1.4, 1.7 and 2.0mm) in the laminar range of Reynolds number 50-450. For all geometric configurations, local air-side heat transfer coefficient and pressure drop are presented in terms of Colburn *j* factor and Fanning friction *f* factor, respectively. In addition, the effect of fin height on thermal hydraulic performance has also been addressed based on local Nusselt number distribution along the fin height. The results reveal that geometric configuration with the louver pitch of l.0mm showed the highest average Nusselt number of 123% at the penalty of 116% pressure drop compared to louver pitch of 2.0mm at the Reynolds number of 50.

Keywords: Microchannel heat exchanger, Louver pitch, Conjugate heat transfer, Nusselt number, Friction factor.

* Corresponding Author: Tel.: +82-53-950-5576; Fax: +82-53-950-6550.
E-mail addresses: manhoe.kim@knu.ac.kr (M.-H. Kim), arslansaleem@knu.ac.kr (A. Saleem)